





This invention relates to bridges and in particular to bridges constructed from prefabricated panels.

Bridges of this type comprise in their simplest form two parallel spaced girders each formed from a single row (or truss) of panels joined end to end, I-section cross girders known as transoms which span between the girders and carry the roadway and the roadway itself which comprises a number of deck panels. The deck panels comprise a series of parallel spaced I-section beams known as stringers to which is secured a deck plate of timber or steel. This basic arrangement can be varied as required by adding one or more rows of panels to each girder beside the original rows and cross bracing the rows and/or by bolting one or more further rows of panels on top of the row or rows of panels in each girder. Additionally reinforcing chords can be attached to the top and bottom of each panel.

As discussed above, known decks for such bridges comprise deck panels which are secured to the transoms and which include steel or timber deck plates. Often bridges of this type are temporary structures, that is, they are frequently employed to provide a

replacement bridge while a permanent bridge is being repaired or constructed. Consequently the deck panels are designed so that the bridge can be readily and quickly assembled and dismantled. However in some situations it would be desirable to employ a bridge of this type for a much longer period of time and consequently there is a need for a more permanent type of deck.

A deck for a bridge having girders constructed from prefabricated panels in accordance with the invention comprises a concrete deck panel, at least one connection plate for connecting each girder to the deck panel, means for securing the plates to the opposite side of the concrete deck panel to the side which will form part of the deck surface and means for attaching the plates to the bridge girders.

Preferably the means for securing the plates to the concrete deck panel comprise shear studs secured to or integral with the plates. The plates can then be positioned in the mould for the concrete deck panel with the studs uppermost and the concrete poured in on top. When the concrete sets, the plates will be securely held in position by the concrete around the studs.

The combination of the studs and concrete with the studs embedded in the concrete provides sufficiently strong connections between the connection plate and the concrete deck panel.

Suitably the plates either have bolts welded thereto whereby they may be attached to the panels via the chord bolt sockets provided in standard panels for the attachment of reinforcing chords. Alternatively the plates can have tapped sockets welded thereto in which case bolts, which may be standard chord bolts, are used to connect the plates to the panels, the bolts passing through the chord bolt sockets and mating with the tapped sockets.

The shear plates can either be provided with sufficient connection means so that they can be employed with all bridges of this type, that is they can be provided with means for connection to girders comprising one, two or more rows of side by side panels. Alternatively plates can be provided for each different girder panel arrangement.

In a preferred embodiment the number of connection plates provided for connecting each girder is equal to the number of rows of prefabricated panels which form the girder.

The bridge panel can be pre-cast and then transported to the bridge location or it can be cast on site.

In accordance with another aspect of the invention apparatus for providing a permanent deck for a bridge whose girders are constructed from prefabricated panels comprises at least two plates, each of which is provided on one side with means whereby it may be connected to at least one panel of a girder of the bridge and on the other side with securing means around which at least part of a concrete deck panel can be cast.

The invention will now be further described by way of example with reference to the accompanying drawings in which:

Figure 1 is a section through a bridge having a deck panel in accordance with the invention and

Figure 2 is a partially exploded view along II - II of the bridge of Figure 1.

The bridge 2 comprises two girders 4 and 6 each of which comprises two rows of panels, 8 and 10, secured end to end. The two rows of panels 8 and 10 are cross braced see 12. Each panel 8 and 10 comprises an

upper chord 14 and a lower chord 16 each of which comprises two back to back U channels 18. The upper and lower chords 14 and 16 are connected and spaced by vertical and diagonal bracing members 20. The upper and lower chords 14 and 16 are provided at one end with a male lug and at the other with a female jaw, the lugs and jaws having holes whereby the panels can be interconnected by pinning together the lugs of one panel to the jaws of another with panel pins 22. The lower chords 16 have reinforcing chords 24 attached thereto to increase the panel strength.

The deck of the bridge 2 comprises a concrete deck panel 26 and four shear plates 28, 29, 30 and 31. The shear plates 28, 29, 30 and 31 have shear studs 32, on one surface and the deck is constructed by positioning the plates 28 to 31 in the mould for the concrete deck panel 26 with the studs 32 uppermost and pouring the concrete on top. The studs 32 act compositely with the deck panel 26, that is, they work together to provide a good connection of the deck panel 26 to the girders 4 and 6 without risk of cracking or failure of the concrete.

The shear plates 28 to 31 are provided on the other side with bolts 34 which are welded thereto. The bolts 34 allow the deck panel 26 to be connected to the girders 4 and 6 via the chord reinforcement sockets which are provided in standard panels for the attachment of reinforcing chords.

Alternatively tapped sockets (not shown) can be welded to the shear plates 28 to 31 and the plates are then secured by screws which pass through the chord bolt sockets in the panels and mate with the tapped sockets.

Parapet posts 36 can be secured to or cast into the deck panel 26.

This deck can be employed with bridges whose girders comprise only a single row of panels or two or more rows of panels. Either a shear plate is provided for each row of panels as shown in the Figures or a single plate can be provided for each girder which has sufficient connection means in the form of bolts 34 or tapped sockets so that it can be secured to any number of rows of panels. Alternatively single shear plates can be provided for each girder but with the exact number of connection means for attachment to a particular



type of bridge girder. The deck panels 26 can be cast onto the plates either in the factory or on site. The shear plates and concrete panel can extend the full length of the bridge or a single panel and two sets of plates positioned end to end can be used.

The arrangement allows a permanent bridge to be easily and quickly constructed.

CLAIMS:

1. A deck for a bridge having at least two girders constructed from pre-fabricated panels, the deck comprising a concrete deck panel, at least one connection plate for connecting each girder to the deck panel, means for securing the plates to the opposite side of the concrete deck panel to the side which will form part of the deck surface and means for attaching the connection plates to the bridge girders.
2. A deck as claimed in Claim 1 in which the securing means comprises shear studs integral with or secured to the connection plates.
3. A deck as claimed in either Claim 1 or 2 in which the means for attaching the connection plates to the bridge girders comprises bolts welded to the plates, which may be inserted into bolt sockets provided in the chords of standard panels.
4. A deck as claimed in either Claims 1 or 2 in which the attaching means comprises tapped sockets welded to the plates, bolts being passed through the chord bolt sockets of the panels and mating with the tapped sockets.
5. A permanent deck for a bridge having at least two girders constructed from pre-fabricated panels, each deck comprising at least two plates, each of which is provided on one side with means whereby it may be connected to at least one panel of a girder and on the other side with securing means, around which at least part of a concrete deck panel has been cast.
6. A deck substantially as described herein with reference to the accompanying drawings.